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RESEARCH ARTICLE

MULTIDISCIPLINARY TREATMENT FOR AVULSED MAXILLARY INCISORS- *A CASE REPORT*

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ABSTRACT

The maxillary incisors can be lost due to dental trauma at a young age. Along with unpleasant smile esthetics, such condition if left untreated for years, can lead to development of malocclusion which cannot be optimally managed by prosthodontics alone. The condition often requires a multidisciplinary approach and careful treatment planning on the part of orthodontist to consider either space closure or space creation for prosthetic replacement, keeping in mind optimum facial esthetics and occlusal stability and function. This case report presents orthodontic treatment of a 27 year old patient, followed by prosthetic rehabilitation of two missing maxillary incisors lost due to trauma at a young age.

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INTRODUCTION

Most traumatic dental injuries occur during childhood and adolescence. A maxillary central incisor is the tooth most commonly affected by dental injury (Grimm *et al*., 2004). Avulsion of teeth may occur and it generally happens in children from 7 to 9 years of age, when vigorous play and sports activities become more regular. A single tooth is frequently involved, but multiple avulsions can also happen (Andreasen *et al*., 1995).Treatment planning dilemmas exist that are best overcome by a multidisciplinary approach that establishes not only an optimal aesthetic result but also conforms to principles of a functional and stable occlusion. There are multiple solutions available to treat this kind of problem. These may include fixed or removable partial dentures, osseointegrated implants, orthodontic space closure (Zachrisson, 1978) or autotransplantation with an immature premolar (Mendoza Mendoza *et al*., 2010; Zachrisson *et al*., 2004) as alternative treatment plans.

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The position of missing tooth, occlusion, age, soft tissue facial profile, tooth morphology, and need for orthodontic treatment all should be considered for the treatment plan.

Case Report

A 27 years old male patient reported with the chief complaint of spacing in his upper front teeth region and wanted replacement of his missing teeth. His dental history revealed dental trauma caused by a fall about 10-15 years ago.No immediate tooth replacement was sought at that time. Extraoral examination showed an orthognathic facial profile with competent lips. (Fig.1) Intraoral examination showed Angle's class I molar relation on both sides. Clinically missing upper right central and lateral incisors. Inadequate edentulous space for replacement of two missing teeth. Upper right canine and left central and lateral incisors are in crossbite. Lower incisors look supraerupted with accentuated curve of spee (Fig.2) Panoramic radiograph showed missing upper right central and lateral incisors. Mesial tipping of upper right canine and upper left cental incisor into the edentulous space (Fig.7)

Treatment objectives

- Creation of space in upper arch orthodontically, for prosthetic replacement of maxillary right central and lateral incisors.
- To correct the negative overjet for establishing Angle's class I incisor and canine relations.
- To correct the accentuated curve of spee.

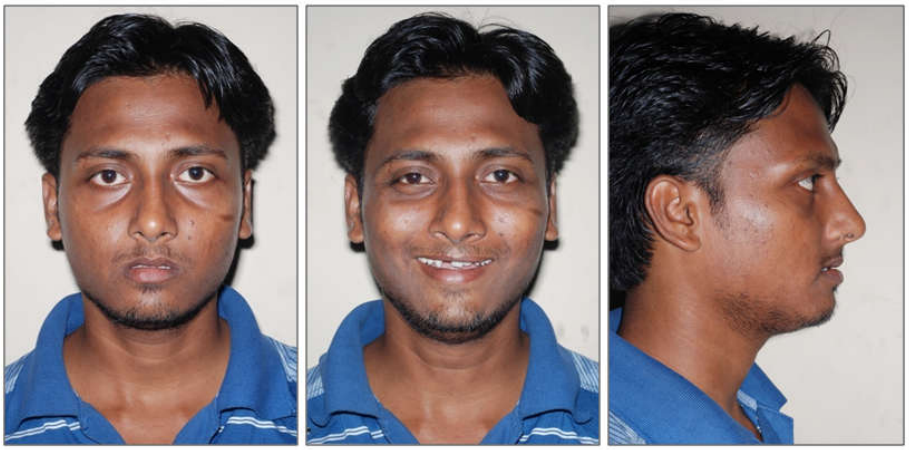

Fig. 1- Pre-treatment facial photographs

Fig. 2- Pre-treatment intraoral photographs

Fig. 3- Treatment progress intraoral photographs- alignment and levelling completed

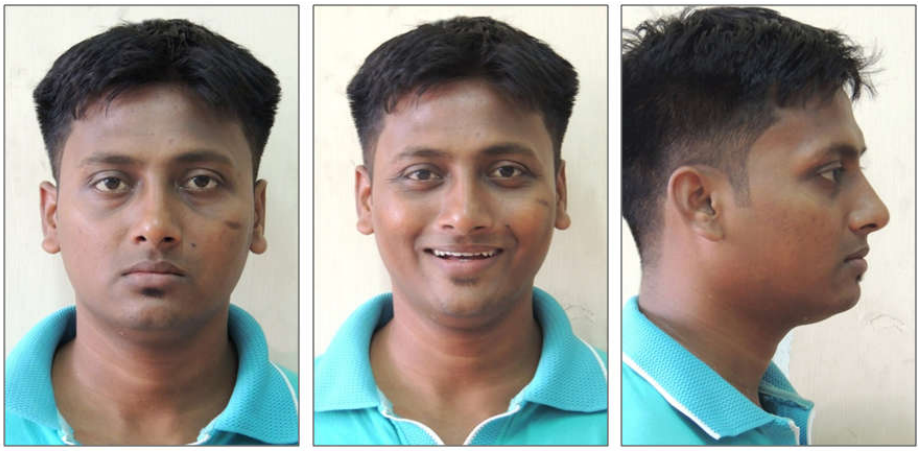

Fig 4. Post-treatment facial photographs

Treatment alternatives

Several treatment alternatives for this patient included the following:

- Prosthesis (removable/fixed) of a single tooth in the available edentulous space without overjet and/or overbite corrections.
- Placement of osseointegrated implants for maxillary right central and lateral incisors, after orthodontic space creation and overjet/overbite correction.
- Placement of fixed partial denture for replacement of maxillary right central and lateral incisors, after orthodontic space creation and overjet/overbite correction.

Treatment progress

A preadjusted fixed appliance 0.022 × 0.028 inch slot (MBT prescription) was bonded to the maxillary and mandibular arches. Conventional alignment and leveling were performed in upper and lower arches. Slight interproximal reduction of lower anteriors was performed and bite opening accomplished by incorporation of reverse curve in mandibular arch wire. Space creation accomplished with NiTi open coil spring. A removable partial denture served as an interim prosthesis following space creation (Fig.3). The orthodontic treatment took approximately 12 months. After removal of orthodontic appliances, a fixed partial denture was given to the patient (Fig.6).

Fig. 5. Post-treatment intraoral photographs: with interim prosthesis (removable partial denture)

Fig. 6- Post-treatment: final prosthesis (fixed partial denture)

The first option would have given esthetically and functionally compromising results. The second option necessitated the need for alveolar ridge augmentation prior to placement of osseointegrated implants. Ridge augmentation was deemed necessary by the prosthodontist as bone loss had occurred due to long-standing edentulism in that area.

Also, implant prosthesis required additional time and cost on the part of the patient for which patient wasn't ready. Therefore the reasons behind ultimately choosing the last alternative were the following: the possibility of achieving esthetics and function without the use of an osseointegrated implant, good occlusion with coincident upper and lower midlines and the permanence of the treatment outcome.

Treatment results

The result was the following: stable occlusion with a class I molar relationship and class I canine relationship; coincident upper and lower midlines, and adequate dental arch alignment (Fig. 5). The treatment goals were achieved by creating a pleasant smile for the patient without the use of an osseointegrated dental implant (Fig. 4). The post treatment panoramic radiograph showed overall parallelism of roots. (Fig.8)

DISCUSSION

Missing maxillary anterior teeth lead to an obvious asymmetry in patient's smile and can lead to deviation in dental midline.

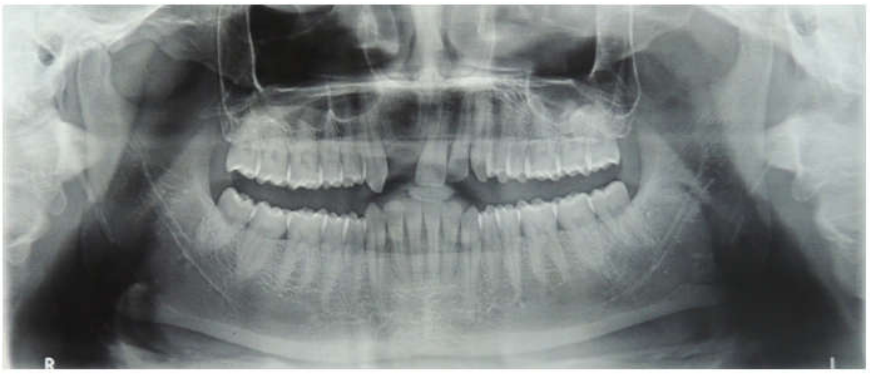

Fig. 7. Pre-treatment panoramic radiograph

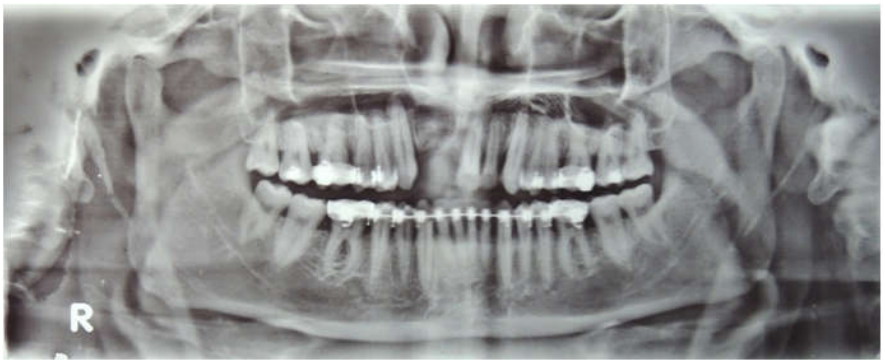

Fig. 8. Post-treatment panoramic radiograph

Preprosthetic orthodontics is often an integral part of comprehensive oral rehabilitation. The individualised plan of treatment should be formulated to optimise dentofacial esthetics and improve function and stability of outcome. Replacement of missing maxillary incisors with osseointegrated implants may be a useful treatment option in adults when maxillary incisors have been lost accidentally or are missing congenitally. Independent studies indicated that progressive infraocclusior over time (even in mature adults) of single implants replacing incisors in the esthetic zone sometimes may make the replacement crown esthetically suboptimal (Jung *et al*., 2008; Thilander *et al*., 2001; Bernard *et al*., 2004; Jemt, 2005).Within the last two decades, the use of osseointegrated implants to replace missing maxillary central and lateral incisors has become a common treatment solution for skeletally mature patients.

However, filling an anterior space with an implant-supported crown is a major challenge from both esthetic and functional aspects. Clinical success depends not only on persisting osseointegration but also on harmonious integration of the crown in the dental arch (Jung *et al*., 2008). The objective of the prosthesis is to not only replace the missing teeth and enhance esthetics but also to maintain the function and integrity of the surrounding dental and facial structures. For the case discussed in this article, alveolar ridge augmentation in maxillary anterior region was deemed necessary by the prosthodontist as bone loss had occurred due to long-standing edentulism in that area. Also, implant prosthesis required additional time and cost on the part of the patient for which patient wasn't ready.

Fixed partial denture (porcelain fused to metal) was finally chosen for this patient. Additionally, this patient had a low smile line which made our choice of prosthesis even more favourable as visibility of metal margins or absence of gingival papilla were not of much esthetic concern in this case. Therefore the reasons behind ultimately choosing fixed partial denture for this case were the following: the possibility of achieving esthetics and function without the use of an osseointegrated implant, lesser treatment cost and time, good occlusion with coincident upper and lower midlines and the permanence of the treatment outcome.

The case discussed in this article required orthodontic uprighting of tilted teeth adjacent to missing teeth site (Fig.7 and 8) and alignment and levelling of lower anterior teeth for creation of the ideal pontic space and positive overjet(Fig.2 and 3) A very common method to extrude posterior teeth in patients with a deep curve of spee is to level the arches with the sequential use of straight continuous archwires [Thilander *et al*., 2001]. Levelling of curve of spee in this case has been accomplished by sequential use of straight continuous archwires and incorporation of slight reverse curve of spee in rectangular ss wire stage. The necessity for an interdisciplinary approach to the treatment of anterior tooth injury has been emphasized for a long time. It is clear that without cooperation among the disciplines, the treatment of such cases is difficult (Polat and Tacir, 2008). The orthodontic therapy prior to the prosthetic therapy, in this case, helped in achieving the ideal pontic space and later the prosthetic rehabilitation not only improved the esthetics but also provided an adequately positive overjet and overbite, providing occlusal harmony.

Conclusion

A multidisciplinary approach may be the best treatment option following severe dental trauma involving the avulsion of one or more incisors. Any concomitant malocclusion can be treated simultaneously, with/without extractions, depending on individual case and the treatment outcome can be deemed as permanent.

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